INSTALLATION MANUAL
FOR *DELPHYS* MX *and DELPHYS* MX *elite*
UNINTERRUPTIBLE POWER SYSTEMS

UPS/NTA GB/DELMX_INS.D

08/03/2005

Certificate of Warranty

The warranty conditions are stipulated in the sales contract, if not the following points shall apply.

The manufacturer exclusively guarantees his own products against any defect in construction or operation arising from faulty design, materials or workmanship according to the conditions set down below.

The manufacturer, at his discretion, is entitled to adapt his product in order to comply with the warranty or replace the faulty parts. The manufacturer's warranty does not apply in the following cases:
- Defects arising either from designs or parts imposed or supplied by the Purchaser.
- Failure due to fortuitous circumstances or force majeure.
- Replacements or repairs resulting from normal wear of units and machinery,
- Damage or injuries caused by negligence, lack of inspection or maintenance, or improper use of the products.

The period of validity of the warranty may never exceed 12 months after delivery.

Replacements, repairs or modifications of parts during the warranty period cannot extend the duration of the warranty.

For these stipulations to be valid, the Purchaser must, within a maximum of 8 days beyond which the warranty lapses, expressly inform the Manufacturer of the faulty design, or the material or manufacturing defect, stating in detail the grounds for his complaint.

Defective parts replaced free of charge by the Manufacturer are to be put at his disposal, so that he may become the sole owner.

The warranty legally ceases if the Purchaser has, of his own initiative, undertaken modifications or repairs on the Manufacturer's products without the written consent of the latter.

The Manufacturer's liability is limited to the obligations as defined herein (repair or replacement), all other items of damage being formally excluded.

The Purchaser is liable for taxes or duties of any kind in compliance with either the European regulations, or those of the country of import or transit.

FOREWORD

We thank you for the trust you have in Socomec Sicon's Uninterruptible Power Systems.

This equipment is fitted with up to date technology. Rectifier and inverter subsets are provided with power semiconductors (IGBT) including a digital micro-controller.

Our equipment complies with standard CEI EN 62040-2 referring to Uninterruptible Power Systems (UPS).
CAUTION : "This is a product for restricted sales distribution to informed partners. Installation restrictions or additional measures may be needed to prevent disturbances".

SAFETY REQUIREMENTS

Using conditions:

Do read carefully this manual and comply with the safety notes mentioned before using the UPS.

Whatever the repairs, they must be made only by authorised staff, who have been suitably trained.

It is recommended that the ambient temperature and the humidity of the UPS environment are maintained below the values specified by the manufacturer.

This equipment meets the requirements of the European directives applied to this product. As a consequence it is labelled as follows:

CE

REGULATIONS CONCERNED WITH ENVIRONMENTAL ISSUES

Recycling of electrical products and equipment.
Provision is made in European countries to break up and recycle materials making up the system. The various components must be disposed of in accordance with the legal provisions in force in the country where the system is installed.

Battery wastes
Used batteries are considered as toxic wastes. It is therefore essential to entrust them solely and exclusively to firms specialised in their recycling. They can not be treated with other industrial or household wastes, as set out in local regulations in force.

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Lexicon :

UPS	: Uninterruptible Power Systems
Module	: set comprising a rectifier, a battery and an inverter in a parallel system
CIM	: Consulting, Inspection and Maintenance Department.

1. GENERAL

This manual gives important information as regards safety, handling and connection of ***DELPHYS* MX** and ***DELPHYS* MX *elite*** UPS's.

2. SAFETY NOTES

For the safety of personnel and equipment, do read very carefully this instruction manual.

WARNING	**Take all precautions when handling the cabinets or the various components of the system, such as batteries.**

CAUTION	**Whatever the connections or the using and maintenance operations, they must be exclusively performed by authorised staff, who have been trained accordingly.**

CAUTION	**EMI filters inside the UPS induce high leakage currents. As a consequence, it is imperative to connect earth cables before any mains connection.**

CAUTION	**The equipment can only be switched on or used if the following conditions are fulfilled :** **- electrical connections comply with the regulation in force (earth bonding, appropriate protections and cross-section of cables)** **- all means to comply with the protection index of the system are in place, such as side panels, doors, glands, shields or whatever...).**

3. GENERAL PACKAGING AND STORAGE CONDITIONS

3.1. UPS packaging

Packaging category	Packing	Applications
Standard BULLPACK packaging	**Equipment is protected by two layers of cellular plastic (or three for non-domestic destinations) fastened with scotch tape.**	**Road transport for domestic market or forwarding to neighbouring countries.**
CPA-type packaging (cardboard pallet)	**At customer's request and in addition to the BULLPACK two-layer protection, extra packaging consists of fastening the equipment to a wooden pallet and to protect it with a cardboard fixed to the pallet. Under specific request, a corrosion proofing barrier can replace the Bullpack protection**	**Road transport for UE countries or air freight for worldwide destinations.**
Packaging SEI 4C (called NEFAB)	**The packaging consists of crates with closed joints and physical-chemical protection. The corrosion protection is guaranteed by a VCI wrapping (Vapour and Corrosion Inhibitor), resistant to considerable difference in temperature and by the addition of desiccant bags. Unless otherwise requested, the storage period is limited to 12 months.**	**Sea transport for equipment that might be stored for an extended period of time.**

3.2. Battery packaging

Batteries are delivered on pallets, in pallets-cases or mounted in cabinets. Avoid striking battery cells and connection terminals.

4. GENERAL RECOMMENDATIONS FOR INSTALLATION

4.1. Premises and location

The proposed location for the UPS should be as follows:

- there should be no obstacle lying on the floor,
- the installation of cables or conduits should be completed,
- the room must be large enough,
- it should be dry, clean and dust-free (a dust preventing paint covering is required in a cement room),
- the local should be free of flammable vapour or corrosive smoke,
- ventilation should be sufficient to ensure a constant temperature to the UPS and to the batteries.

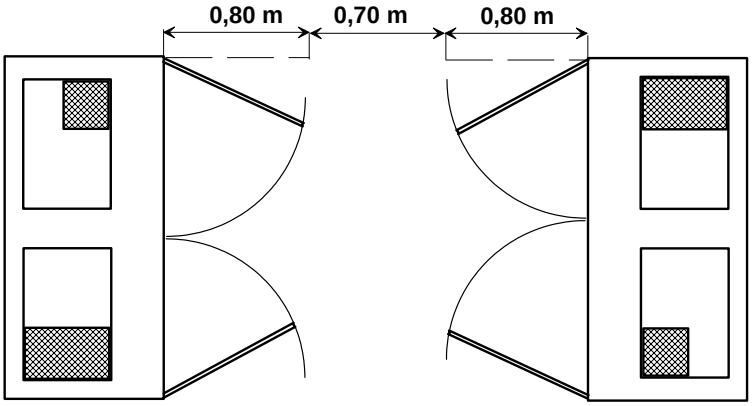
The recommended ambient temperature is between 15°C and 25°C

4.2. Constraint for cabinet location

To ensure the proper ventilation of the equipment, always leave a minimum clear distance of 700 mm between the top of the cabinet and the ceiling.

No clearance at the back of the cabinet is required. Hence :
- Two units can be placed back to back
- The unit can be placed against a wall.

When the cabinets are placed face to face, leave a clearance of 2,30 m to give free way[1] when the doors **of the cabinets are opened.**



Top view of two face to face UPS's

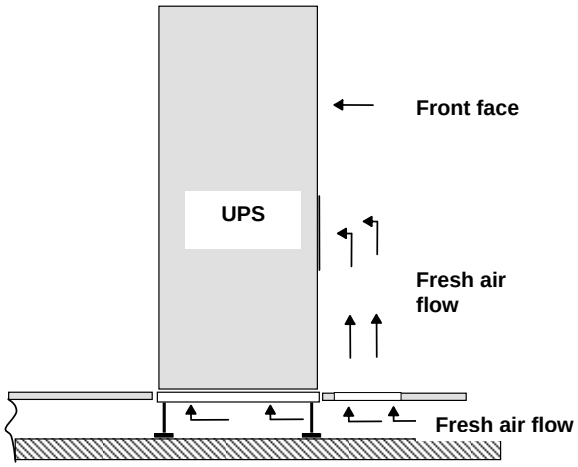
4.3. Installation on a raised floor

For weight and space requirements, the UPS is installed on a specific base (Seek advice from the factory).

Inject fresh air under the cabinets,

Provide cut-outs in the raised floor for adequate ventilation to the front.

Dimensions of the cut-outs :
- length of UPS cabinet
- width : 0,15 m minimum

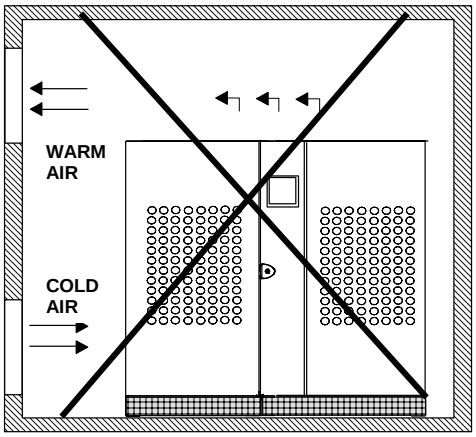


[1] Specifications as per standard IEC 60364 or NFC15100

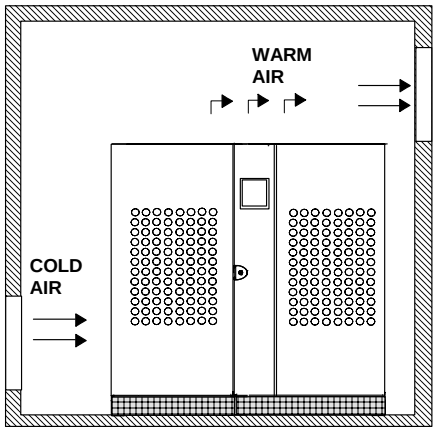
4.4. Ventilation and air conditioning constraints

VENTILATION

WRONG

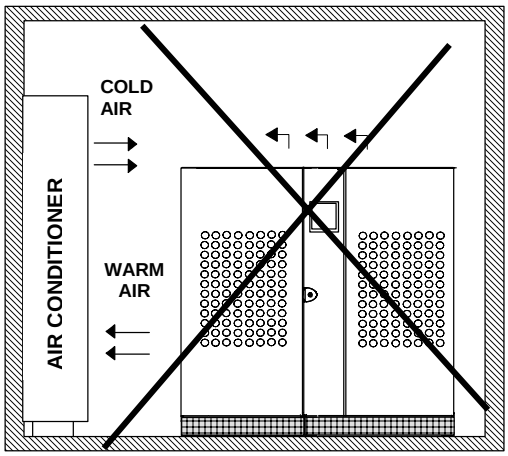


RIGHT

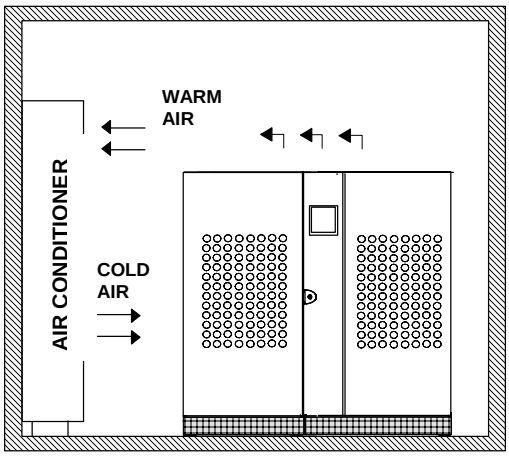


AIR CONDITIONING

WRONG



RIGHT



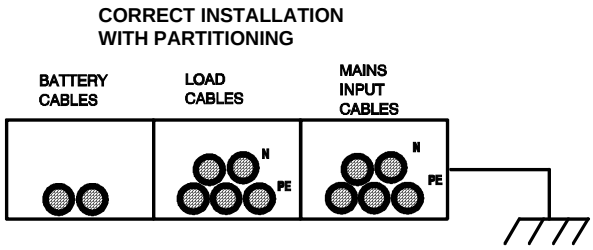
5. HEAT LOSS AND VENTILATION

The recommended ambient temperature is between 15 and 25°C.

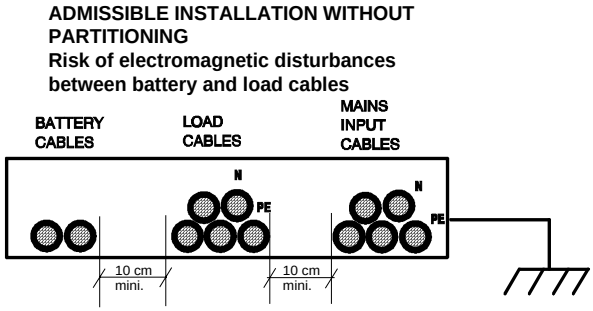
POWER (kVA)	AIR FLOW (m3/h)	HEAT LOSS at Pn (kW)		HEAT LOSS at Pn (kcal/h)	
		MX	MX elite	MX	MX elite
250	6140	14	16	12500	13770
300	6140	16	19	13370	16350
400	6140	19,7	24	17000	20700
500	6140	-	31	-	26680

5.1. General rules for cable installation on tray

Power cables
Connection to the system cabinets:
All metallic cable trays must be grounded.
Divide the power cables into groups, according to the different circuits :
- mains input,
- battery input,
- connections to each unit,
- load output.

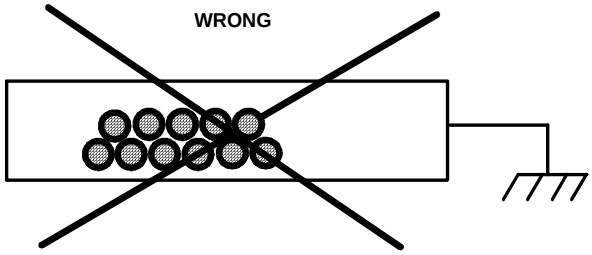


Gather all poles of a power circuit in the same group :
- poles + and - for the battery,
- 3 phases + PE for a three-phase distribution (rectifier supply),
- 3 phases + neutral + PE for the bypass supply, or the distribution,
- 3 phases + PE for the bypass supply through an isolation transformer.



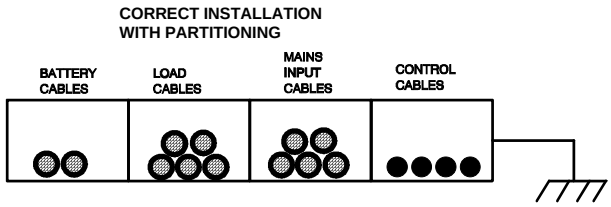
CAUTION :

All metallic cable trays -either fixed to the wall or in a raised floor- must be grounded and connected to the corresponding cabinets.

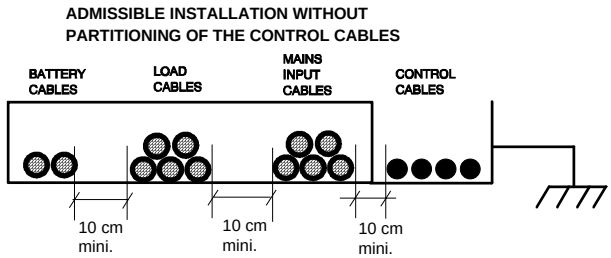


Control cables and low power connections:

This category includes :
- the connections between the cabinets and each unit,
- the alarm signals,
- the remote control connection,
- the connections to the BMS (Building Management System),
- the emergency stop,
- the connection to the generator set.

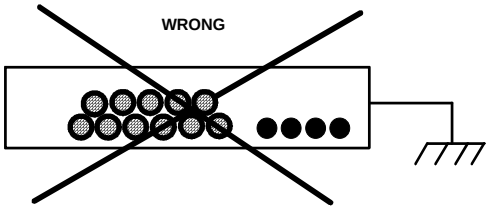


Do not place power and control cables together in the same tray and same group.



CAUTION :

ALL METALLIC CABLE TRAYS, MUST BE GROUNDED AND CONNECTED TO THE CORRESPONDING CABINETS.



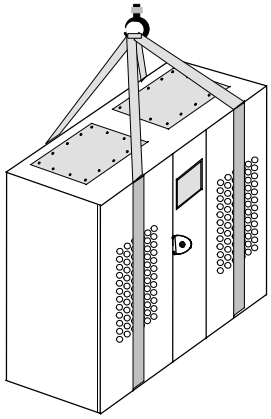
6. HANDLING FROM ABOVE

For weight and dimensions of the UPS, please see section 10.
Please, take into account the instructions provided for handling, so as to avoid damage to the equipment.

THE USE OF STRAPS IS PROHIBITED

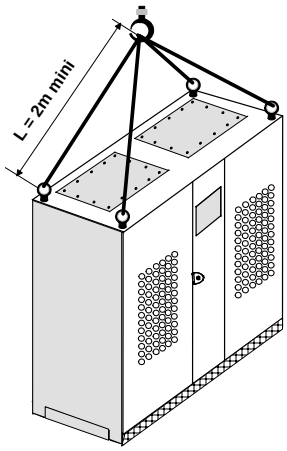
IMPORTANT:

THE CABINETS MUST BE KEPT IN AN UPRIGHT POSITION WHEN SHIPPED OR HANDLED.



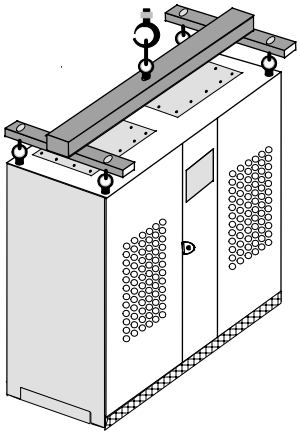
HANDLING BY USING SLINGS

Slings can be used, provided that they are ≥ 2 m.



HANDLING BY USING A LIFTING BEAM

If the height under ceiling does not allow the use of slings, it is preferable to use a lifting beam.

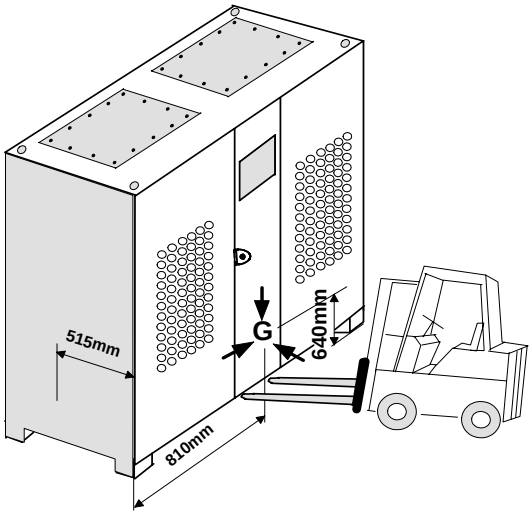


NOTE : eye screws of M16 type with 35-mm inner diameter are supplied on request. Remove the screw or plastic part protecting the thread and insert the eye screws.
In order to meet the protection index specified, do no forget to replace the screws or plastic parts after removing the eye screws.

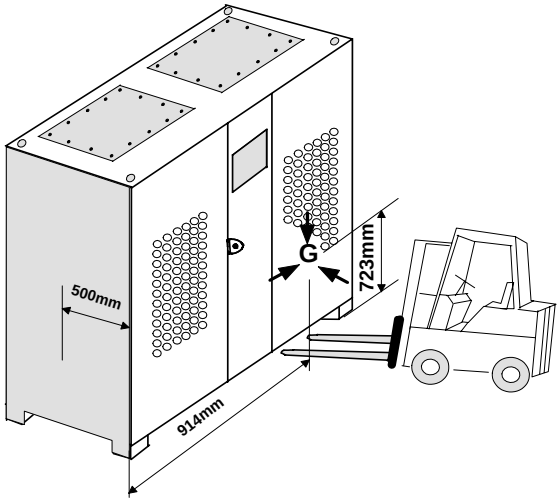
7. HANDLING FROM UNDERNEATH

Remove the grilles on the front and rear of the cabinet and introduce the fork under the unit.
Caution : the load can be unbalanced (Please see below).
Mind the position of the gravity centre for each UPS range when using a lifting truck.

Gravity centre for *DELPHYS* MX *elite*



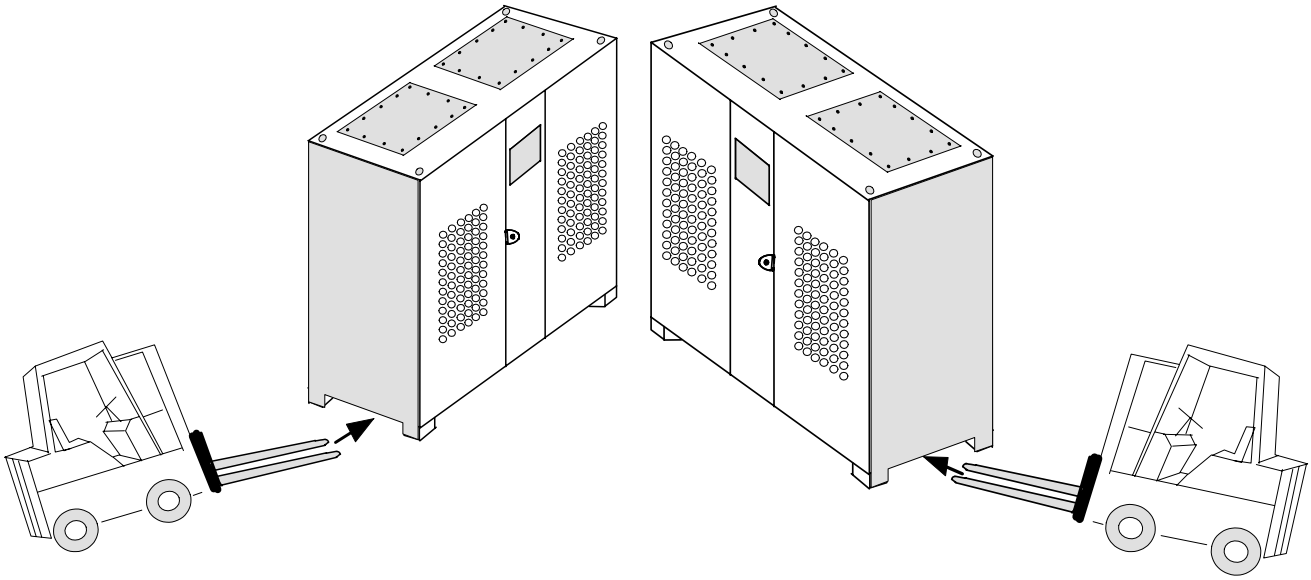
Gravity centre for *DELPHYS* MX



Lateral handling is also possible, provided that the bottom side panels are removed. The lifting truck must have long fork.

Handling from the left

Handling from the right



Note : the fork should be at least 1600 mm long

8. INSTALLATION

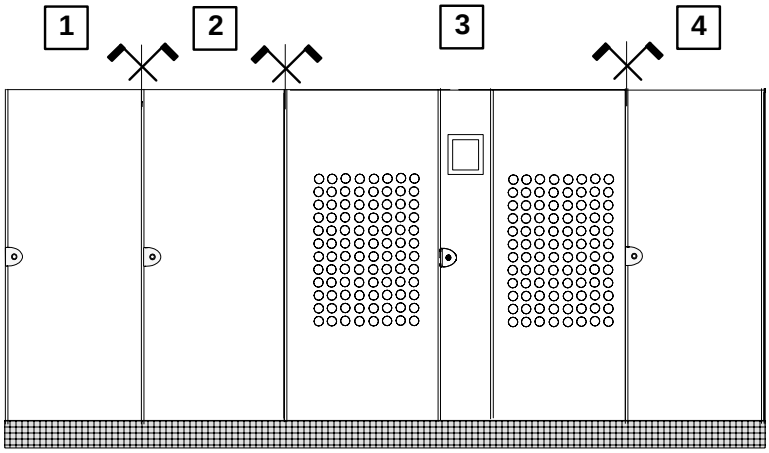
8.1. Cabinet positioning

To make transport and handling easier, the system is separated into cabinets (or cabinet sets).

The 'Y' symbol on the front face indicates the separation points between the cabinets.

The individual cabinet position should correspond with sequence / numbers indicated on the front view of the system.

(The number of each cabinet is indicated on the right top corner on the inside of the door).



Note : reference should be made to the technical details in the drawing file.

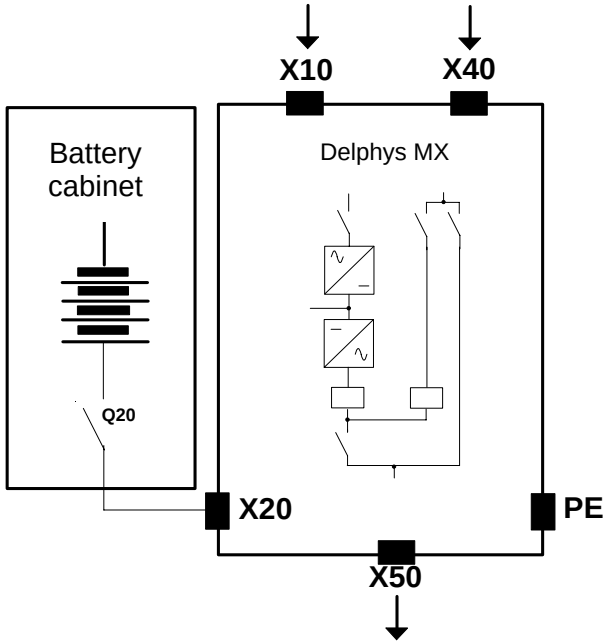
8.2. Layout of power connections

When assembling the cabinets, the "■" symbols mentioned on the basic scheme indicate the power connections to be achieved.

PE : earth bonding,
X10 : rectifier mains input,
X20 : battery input,
X40 : bypass mains input,
X50 : output to the load.

For connection arrangements, please see section 11.

Note : reference should be made to the technical details of the drawing file.



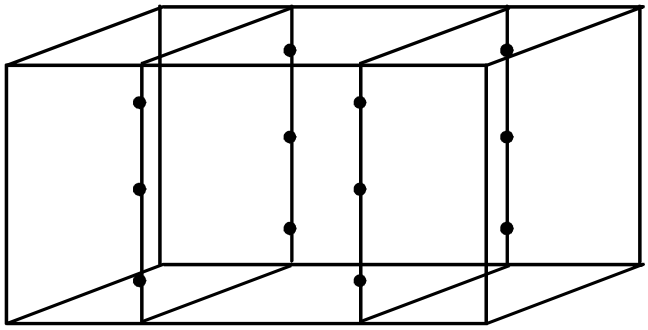
Note : For dimensions and designation of terminals and terminations, please see section 11.

9. GENERAL RULES FOR CABINET ASSEMBLING

9.1. Inverter cabinets

BETWEEN EACH OTHERS

Use tensilock screws - supplied by the manufacturer - to assemble the different cabinets.
These are 'welded structure-type cabinets', meeting all requirements as regards electromagnetic compatibility.
The tensilock screws bite into the paint and guarantee electric contact between the frame and the different cabinets.
They also guarantee equipotential grounding.



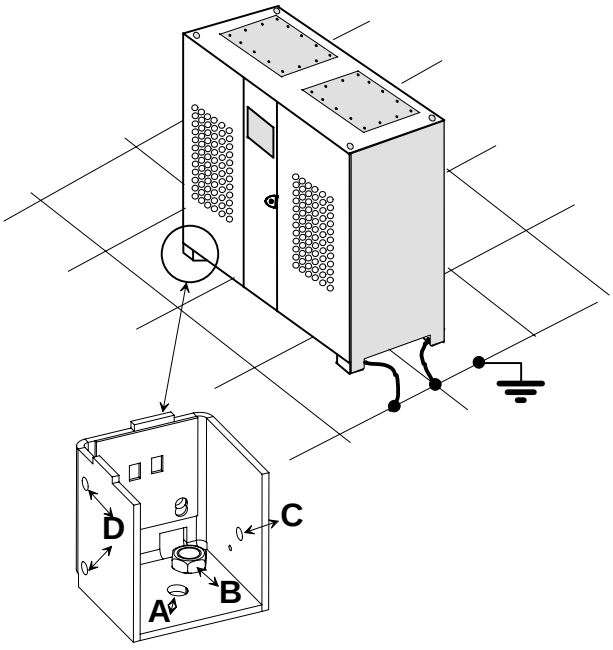
NOTE : if cabinets are placed against a wall, screw fixings located at the rear are not accessible; as a result the screw on the top of the rear panel will be the only one to be fixed.

ON A RAISED FLOOR (or directly on the floor)

Each foot of the cabinet needs to be linked up to the metallic mesh network (if the cabinet is on a raised floor) or to have direct earth bonding (if the cabinet is directly positioned on the floor) by using short links with a cross-section ≥ 35 mm².

Use braidings to connect all the metallic feet of the raised floor and guarantee equipotential cabling.

A = fixing to the floor (hole ∅ 13),
B = screw THM 14 for level adjustment,
C = fixing of braidings,
D = fixing of the grille



SEPARATED CABINETS

Avoid spaces between cabinets. Connect the cabinets to each other by using a conductor with a cross-section ≥ 35 mm² and not exceeding a 20-meter length. An accessible and grounded metallic mesh network can also be a solution if every cabinet is connected to this network (see above).

9.2. Battery cabinets

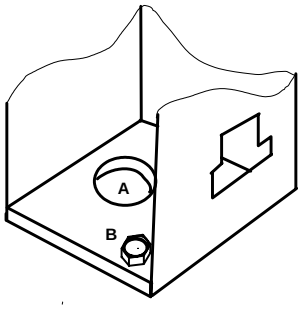
ELECTRICAL SAFETY	**For safety reasons during transports and handling, batteries are disconnected at the level of each rack (or by sections not exceeding 150 V). Take all necessary precautions when reconnecting the cables.**

MECANICAL SAFETY	**For batteries on racks or in cabinets, the cabinet must be fixed to the floor to prevent it from falling over. Each cabinet is fitted with pre-drilled feet - See dimensions below.**

CABINET FIXING TO THE FLOOR

FEET OF BATTERY CABINET

Each foot has a floor fixing hole (labelled A : ∅ 13) and a welded nut for level adjusting (labelled B : screw THM12 not supplied).



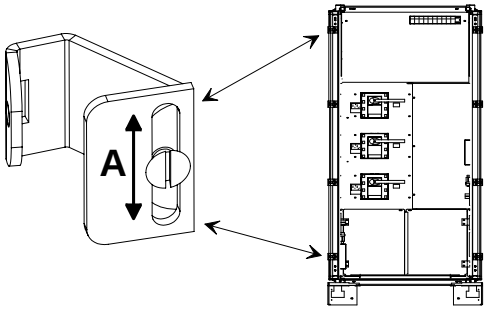
CAUTION : When the battery cabinet is installed, cut and remove the plastic fastening of battery cells in order to release the safety valve.

ELECTRICAL CONNECTIONS

CAUTION	Connection must be performed by authorised staff, which have been previously trained. Connections to be performed are : - grounding of battery cabinet, - polarities + and – to the inverter, - between battery sections and/or between shelves.

9.3. Adjusting the fastening rod of Cadrys Delta cabinets

Adjust part marked "A" to your needs in order to adapt the insert of the fastening rod.



10. DIMENSIONS AND WEIGHTS

The packed weight of each item is shown:
- with paint on wooden crates,
- with indelible felt pen on cellular plastics if standard packing is used.

10.1. UPS cabinets and modular units (for parallel system).

POWER (kVA)	250 3-ph	300 3-ph	400 3-ph	500 3-ph
WEIGHT MX range (kg)	1650	1700	1800	-
WEIGHT MX *elite* range (kg)	2210	2260	2450	2900
	1600			
DEPTH (mm) - floor requirement	950			
- Overall dimensions with door handle	995			
- door, handle and rear panel excluded	945			
HEIGHT (mm)	1930			

10.2. Central bypass cabinet

POWER (kVA)	500 to 800 3-ph	900 to 1200 3-ph	1500 to 2000 3-ph
WEIGHT (kg)	420	600	2000
WIDTH (mm)	1000	1300	3200
DEPTH (mm) - floor requirement	815		1200
- Overall dimensions with door handle	845		1220
- door, handle and rear panel excluded	800		1175
HEIGHT (mm)	1930		

10.3. Bypass isolating transformer (for linear loads)

Note: for supplying non-linear loads, please seek advice from the factory.

POWER (kVA)	250 and 300 3-ph	400 3-ph	500 and 600 3-ph	800 3-ph
WEIGHT (kg)	980	1500	2000	*
WIDTH (mm)	1000	1200	1200	1200
DEPTH (mm) - floor requirement	815			
- Overall dimensions with door handle	845			
- door, handle and rear panel excluded	800			
HEIGHT (mm)	1930			

* Depends on the type of equipment.

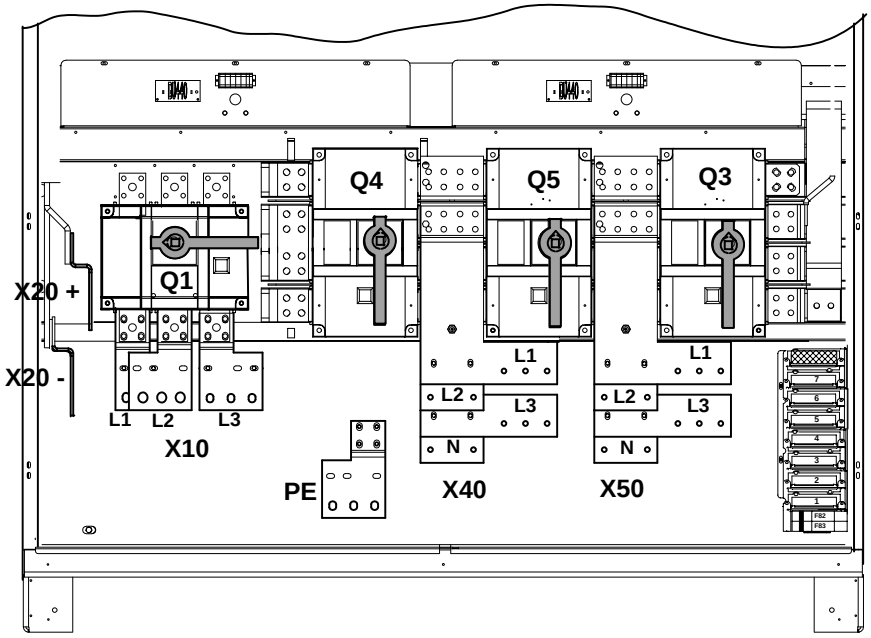
11. LOCATION AND DIMENSIONS OF TERMINALS

11.1. Separated rectifier and bypass inputs

- PE : Protection conductor
- X10: Rectifier input
- X40: Bypass input
- X50: To the load

Note: all terminations are in copper and perforated with 3 holes ∅13 for screws of M12 type.

The maximum cross section is 3x300mm² in aluminium



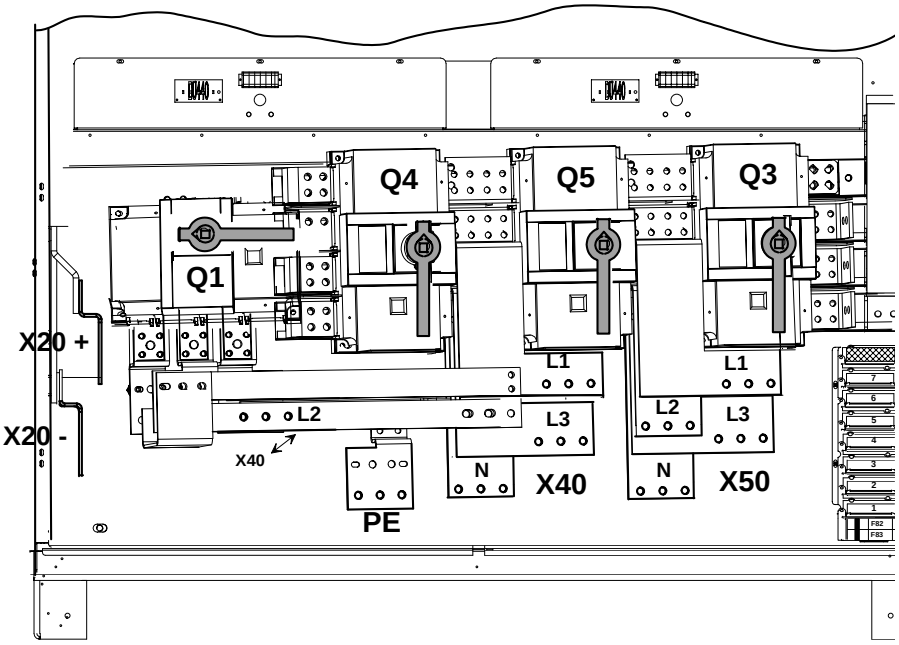
11.2. Common rectifier and bypass input

With a common rectifier and bypass input, a busbar is provided to make the connections between the rectifier input and the bypass input terminals.

- PE : Protection conductor
- X40: Common rectifier and bypass input
- X50: To the load

Note: all terminations are in copper and perforated with 3 holes ∅13 for screws of M12 type.

The maximum cross section is 3x300mm² in aluminium

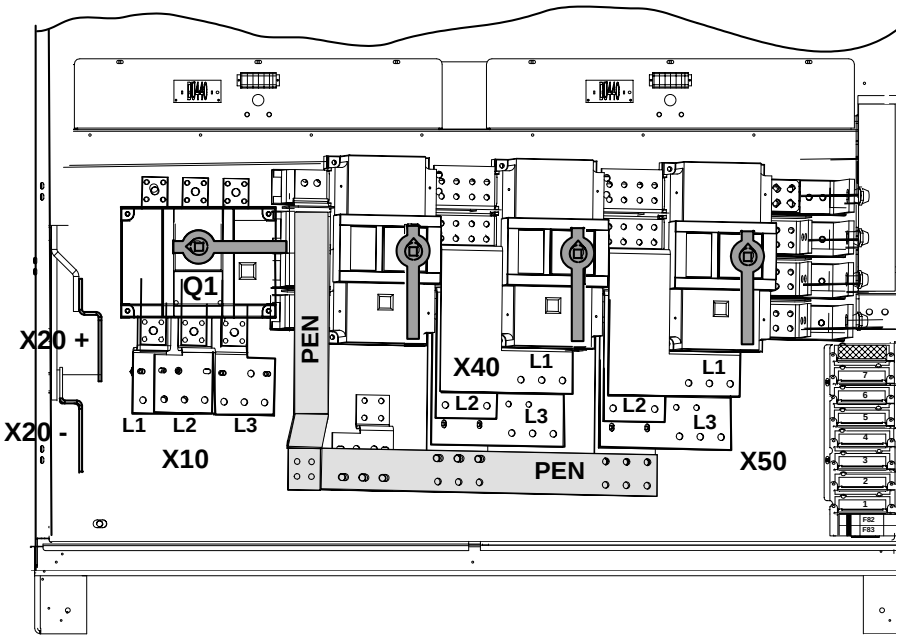


11.3. Connection to a neutral system of TNC type

- PE : Protection conductor
- X10: Rectifier input
- X40: Bypass input
- X50: To the load

Note: all terminations are in copper and perforated with 3 holes of ∅13 for screws of M12 type.

The maximum cross section is 3x300mm² in aluminium



11.4. Terminals for unit inputs on bypass cabinet

POWER (kVA)	UNIT INPUTS	Dimensions of terminals
600 to 800 3-ph	X45	Terminations in Cu, 3 holes ∅13, screw THM12
1200 3-ph	X45	Terminations in Cu, 6 holes ∅13, screw THM12

11.5. Terminals for mains input/load output on the bypass cabinet

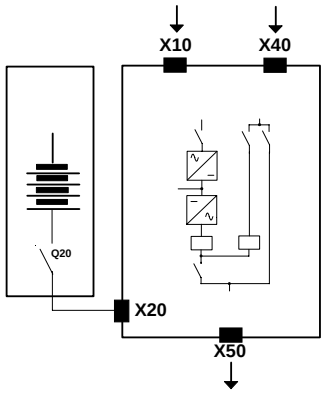
POWER (kVA)	INPUT (X40) TO LOAD (X50)	Dimensions of terminals
600 to 800 3-ph	X40 and X50	Terminations in Cu, 3 holes ∅13, screw THM12
1200 3-ph	X40 and X50	Terminations in Cu [2], 6 holes ∅13, screw THM12

[2] Extension terminals (3 holes ∅13) are to be moved from X40 to X50 if cable input is from above. The maximum cross section is 3x300mm² in aluminium.

12. DESCRIPTION OF POSSIBLE UPS CONFIGURATIONS

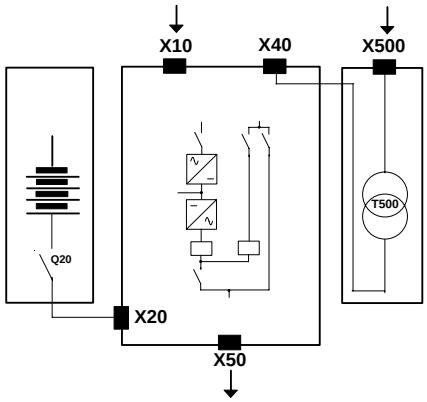
STANDARD UPS
WITH NON ISOLATED RECTIFIER

X10 = RECTIFIER INPUT
X20 = BATTERY CONNECTION
X40 = BYPASS INPUT
X50 = OUTPUT TO THE LOAD



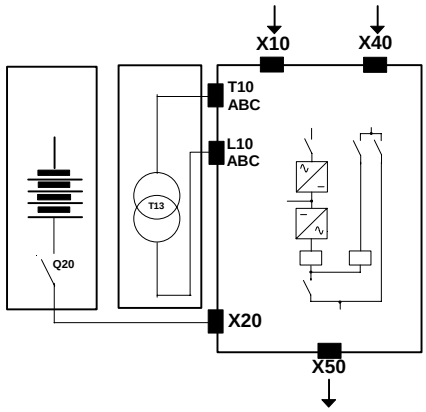
STANDARD UPS
WITH NON ISOLATED RECTIFIER
AND BYPASS TRANSFORMER

X10 = RECTIFIER INPUT
X20 = BATTERY CONNECTION
X500 = BYPASS INPUT
X50 = OUTPUT TO THE LOAD



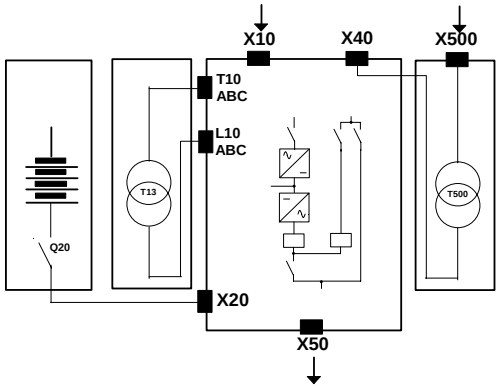
STANDARD UPS
WITH ISOLATED RECTIFIER

X10 = RECTIFIER INPUT
T10 ABC = primary transfo T13
L10 ABC = secondary transfo T13
X20 = BATTERY CONNECTION
X40 = BYPASS INPUT
X50 = OUTPUT TO THE LOAD



STANDARD UPS
WITH ISOLATED RECTIFIER
AND BYPASS TRANSFORMER

X10 = RECTIFIER INPUT
T10 ABC = primary transfo T13
L10 ABC = secondary transfo T13
X20 = BATTERY CONNECTION
X500 = BYPASS INPUT
X50 = OUTPUT TO THE LOAD



13. EXTERNAL CONNECTIONS

External connections are:
- grounding connection,
- rectifier and bypass connections,
- load output,
- emergency stop and alarm transfers.

13.1. Grounding precautions

UPS's manufactured by SOCOMEC SICON UPS are designed for any grounding systems and are compatible with IT, TNS, TT neutral arrangements.
When the neutral arrangement is of TNC type, the equipment must have a PEN conductor.
In cases of different neutral systems between the utility and the load, a transformer must be installed at the bypass input to carry out isolation.

13.2. Connecting earth cables

IMPORTANT : due to EMI filters*, there are "HIGH LEAKAGE CURRENTS".
As a consequence, it is imperative to connect earth cables before mains cables.

* EMI filters = protection against electromagnetic disturbances.

13.3. Earth cable cross-section

The earth cable cross section should be equal to the phase cable cross-section.

13.4. Leakage current (rating of the differential protection)

The minimum differential current recommended is 300 mA.

13.5. Neutral cable cross-section

It is necessary to check:

a) the minimum cross-section of the neutral cable must equal one of the phase conductors.

It is recommended to double the neutral conductor cross-section for supplying non-linear loads as soon as: Icrest per phase / I r.m.s. per phase > 2,2.

b) the balancing of the loads across the three phases,
c) the values that will trip the protective devices.

14. VALUES OF CURRENTS FOR CABLE SIZING

NOTE : these values are only indicative for standard systems.

14.1. Input currents for a rectifier with a 50A charger (standard back up time)

Operating conditions are as follows:
Input/output power supply voltage 3x400V,
The UPS is operating at rated power and batteries are recharging.

POWER on UPS output (kVA)	UPS MX Max. rectifier input current	UPS MX elite Max. rectifier input current
250 kVA 3-phase	365A	365A
300 kVA 3-phase	435A	435A
400 kVA 3-phase	570A	570A
500 kVA 3-phase	-	715A

14.2. Input currents for a rectifier with a 100A charger (expanded back up time)

Operating conditions are as follows:
Input/output power supply voltage 3x400V,
The UPS is operating at rated power and batteries are recharging.

POWER on UPS output (kVA)	UPS MX Max. rectifier input current	UPS MX elite Max. rectifier input current
250 kVA 3-phase	398	398A
300 kVA 3-phase	468	468A
400 kVA 3-phase	602	602A
500 kVA 3-phase	-	755A

14.3. Battery currents at the end of the back up time

The UPS is operating at rated power and batteries are recharging.

UPS Power	250 kVA	300kVA	400kVA	500kVA
Currents	721A*	865A*	1130A*	1276A*

* Maximum value before UPS shutdown

14.4. Bypass current (or output current to the load)

Operating conditions are as follows:
- input/output power supply voltage 3x400V,
- The UPS is operating at rated power.

UPS power	250 kVA	300kVA	400kVA	500kVA
Current per phase	362A	435A	580A	722A

Note: Rating of cables and protections upstream of the bypass shall take into account the following:
- overloads caused by non-linear loads,
- possible overloads admitted by the UPS i.e. 1,1In for 1h, 1,25In for 10min or 1,5In for 1min.

15. SIZING OF CIRCUIT BREAKERS

15.1. Rectifier input circuit breaker

Values are only indicative as per the following conditions:
- the rectifier and bypass input voltage is 3x400V with a cos phi = 0,8,
- the length of cabling between the circuit breaker and the UPS is <10 metres.

UPS type		250kVA	300kVA	400kVA	500kVA
MX	Charger 50A	400A 3p	630A 3p	630A 3p	-
	Charger 100A	630A 3p	630A 3p	800A 3p	-
MX elite non isolated	Charger 50A	400Av 3p	630A 3p	630A 3p	800A 3p
	Charger 100A	630A 3p	630A 3p	800A 3p	1000A 3p
MX elite isolated	Charger 50A	630A 3p	630A 3p	630A 3p	800A 3p
	Charger 100A	630A 3p	630A 3p	800A 3p	1000 3p

Note 1: the admissible input voltage tolerance is +/-10% - the sizing of circuit breaker has therefore to be adjusted accordingly.

15.2. Circuit breaker on bypass input

Values are only indicative as per the following conditions:
- the rectifier and bypass input voltage is 3x400V with a cos phi = 0,8 on linear loads,
- the length of cabling between the circuit breaker and the UPS is <10 metres.

UPS power	250kVA	300kVA	400kVA	500kVA
Circuit breaker on the bypass input	400A 4p	630A 4p	630A 4p	800A 4p

Note 1: the admissible input voltage tolerance is +/-10% - the sizing of circuit breaker has therefore to be adjusted accordingly.

Note 2: the protection on the bypass input is intended for cable protection and does not take into account the I^2T of thyristors.

15.3. Circuit breaker on a common rectifier and bypass input

Values are only indicative as per the following conditions:
- the rectifier and bypass input voltage is 3x400V with a cos phi = 0,8 on linear loads,
- the length of cabling between the circuit breaker and the UPS is <10 metres.

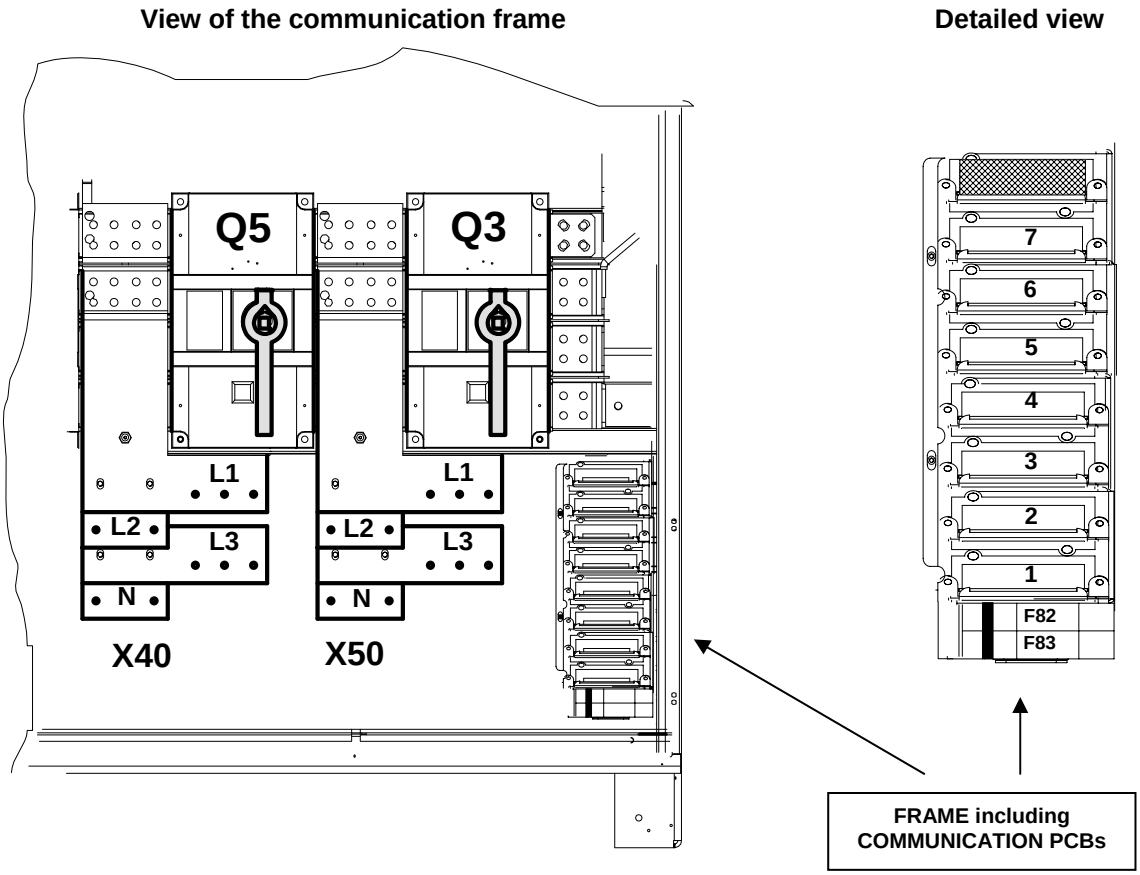
UPS power	250kVA	300kVA	400kVA	500kVA
General circuit breaker on the UPS input	630A 4p	630A 4p	800A 4p	1000A 4p

Note: the admissible input voltage tolerance is +/-10% - the sizing of circuit breaker has therefore to be adjusted accordingly.

16. OPTIONAL COM - SLOT FRAME FOR EXTERNAL COMMUNICATION

16.1. Layout of the COM-SLOT frame

PCB's are gathered on a specific frame located in the bottom right corner of the UPS (See below).



Seven slots identified from 1 to 7 can be used.

Slot 1:
Standard interface PCB is provided as a standard with 3 inputs and 4 outputs with defined data (See section 14.2.2).

Slot 2, 3 and 4:
These ADC PCBs are optional with 4 input and 3 output data that can be set as per customer's requirements. Using 3 ADC PCBs in the respective slots allow to have up to 12 settable inputs and up to 9 settable outputs.

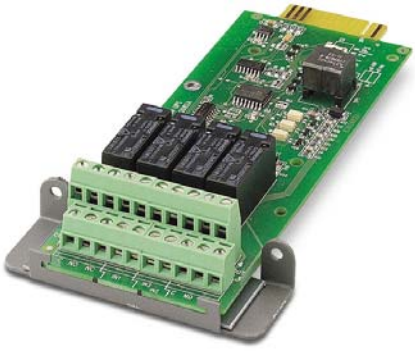
Slots 5 and 6 : the following communication PCBs can be selected:

- a series communication interface via an isolated RS232/RS485 connection using MODBUS/JBUS protocol
- a NET VISION interface for connection to the Ethernet,

Slot 7 :
option intended for the MODEM PCB or remote mimic panel. (The remote mimic panel has to be forecasted in the order because it requires specific modification in the COM-SLOT).

16.2. STANDARD and ADC PCBs (UIO – 0x)

16.2.1. Layout



16.2.2. Description of input and output data

Input data :

- Emergency stop	loop closing on terminations IN1- and IN1+*,
- Opening of battery connection	loop closing on terminations IN2- and IN2+,
- Emergency generator	loop closing on terminations IN3- and IN3+.

* dual input to allow the transfer of alarms.

Output data :

- General Alarm	dry contacts, terminations C1	NO1	NC1*
- Servicing alarm	dry contacts, terminations C2	NO2	NC2*
- Battery operation	dry contacts, terminations C3	NO3	NC3*
- LOAD ON MAINS	dry contacts, terminations C4	NO4	NC4*

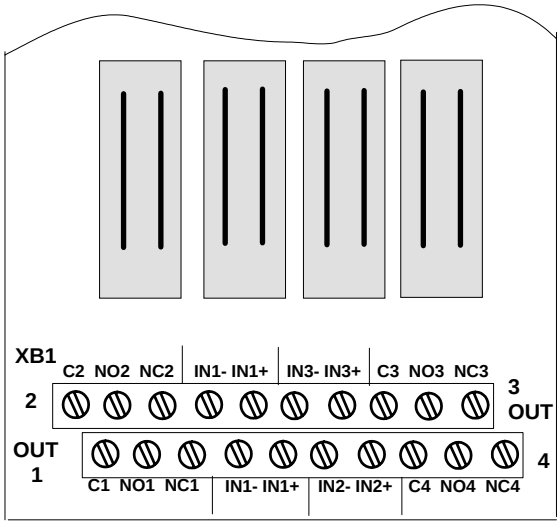
* C = Common ; NO = make contact ; NC = break contact.

16.2.3. Description of terminals

The wire size capacity of screw terminals is between 0,5 and 1,5 mm^2

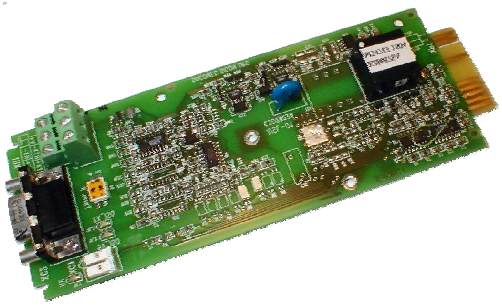
The emergency stop has a dual input for the transfer of alarms.

Breaking capacity : 8A/230V AC.



16.3. Serial connection PCB (USL – 0x)

16.3.1. Layout



16.3.2. Description of connections

RS232 XC2 : female DB9 standard connector of PC type.

RS485 isolated XB1 : RTX+ and RTX-

RS422 isolated XB1 : RTX+ for 'Transmit +'
RTX- for 'Transmit –'
RX+
RX-

LEDs VL1 and VL3 provide information about the reception and transmission steps.
LED VL2 indicates whether there is voltage or not.

17. EMERGENCY STOP (ESD)

The UPS emergency stop causes:
- the load to be shutdown
- the rectifier and inverter to be shutdown while the battery remains connected. However, the battery connection can be made open on request, through the addition of a Mx coil, directly controlled by the emergency stop (Please, see following sections).

Single UPS (Standard PCB)

The emergency stop is carried out through the closing of the loop on terminations IN- and IN+.
Dual input is provided to ensure the transfer of alarms.
Opening of the loop can be set at commissioning.

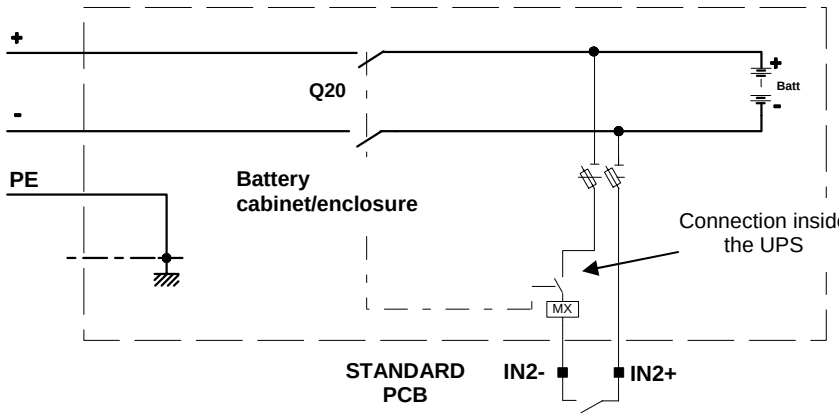
Modular systems
Each unit is fitted with a COM SLOT frame including a standard PCB. The emergency stop can either control each unit separately or the whole system, provided that each loop is galvanically separated.

Central bypass systems
The central bypass cabinet incorporates a COM-SLOT frame including a standard PCB.
The emergency stop can control :
- only the central bypass cabinet (standard PCB – terminations IN1- and IN1+),
- the whole system, provided that galvanic isolation is carried out between each loop.

18. AUTOMATIC OPENING OF BATTERY PROTECTION Q20

Opening of Q20 is controlled through loop closing on terminations IN2- and IN2+ of the standard PCB.

This option enables Q20 to be opened following an emergency shutdown or a slow discharge.



18.1. Generator set operation

A so-called GENERATOR SET information allows the UPS to operate according to gen set conditions. The manufacturer can set three conditions for generator set operation, that is:

a) output voltage of charger(s) adjusted to the off-load voltage of the batteries. In such a case, the corresponding input is on terminations IN3- and IN3+ of the standard PCB,

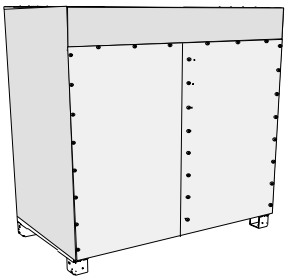
b) desynchronisation of the inverter from the bypass mains and bypass locked, thus no transfer to the bypass mains is possible,
Case of a modular system : each module has to be connected to terminations IN3- and IN3+ of the standard PCB,
Case of a central bypass system : the input is in the central bypass cabinet and has to be connected to terminations IN3- and IN3+ of the standard PCB. This data is transmitted via the internal bus to each module, that can individually be adjusted to a different off-load voltage.

c) function a) and function b) through contact combination.

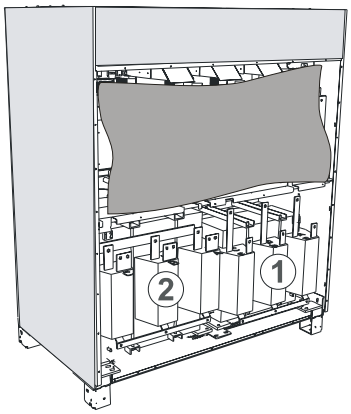
NOTE	**Without a specific request, the factory standard setting implies there is no action on the UPS when the generator set is operating. Configurations mentioned above, can be set at commissioning**

19. REMOVING AND ASSEMBLING TRANSFORMERS IN THE UPS

Comply with the following operations:

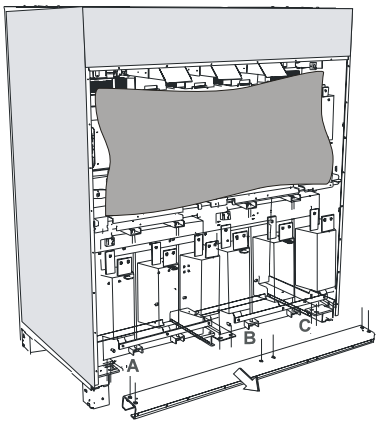


Loosen the 30 screws maintaining the 2 panels at the rear of the equipment.

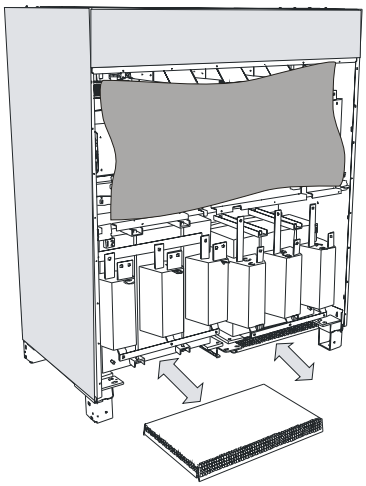


Rear view :
- N° 1 → input transformer of the UPS
- N° 2 → output transformer of the UPS

For the DELPHYS MX range, only transformer N° 2 is provided.

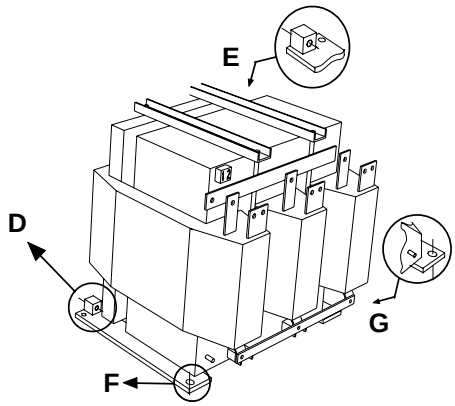


Loosen the 6 screws THM12 marked A, B & C allowing the bar to be removed.



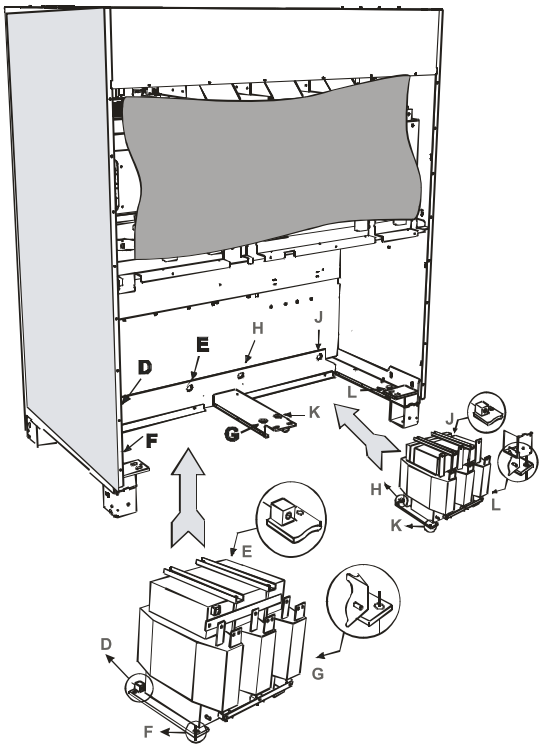
Remove the dust filters (if any) by pulling them out horizontally.

Undo the electrical connections of the transformer(s).



There are 4 fixing screws for each transformer :

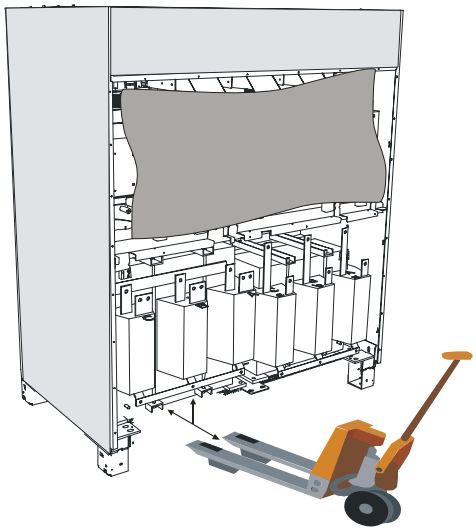
- **2 screws THM12 for horizontal fixing (D & E).**
- **2 screws THM12 for vertical fixing (F & G).**



General view detailing the way transformers are fixed.

- Transformer 2 :
screws D & E for horizontal fixing,
screws F & G for vertical fixing.

- Transformer 1 :
screws H & J for horizontal fixing,
screws K & L for vertical fixing.



Fork of the handling device must be placed under the transformer for extracting it.

For assembling, proceed in the reverse order.

CAUTION : the grille below the UPS must be repositioned at the end of the process because it is also used as an electromagnetic compatibility shield.